

What is claimed is:

1. An image forming apparatus comprising:

a spatial light-modulation element having a plurality of pixel portions which are two-dimensionally arranged, and individually modulate a plurality of portions of light applied to the spatial light-modulation element, according to control signals;

a light source which applies the light to said spatial light-modulation element;

a first image-forming optical system arranged so that the plurality of portions of the light modulated by said plurality of pixel portions pass through the first image-forming optical system;

a microlens array being arranged in a vicinity of an image-forming plane of the first image-forming optical system, and having a plurality of microlenses arranged in correspondence with the plurality of pixel portions, respectively; and

a second image-forming optical system being arranged so that the plurality of portions of the light which have passed through said plurality of microlenses pass through the second image-forming optical system, and forming on a predetermined surface an image represented by the plurality of portions of the light modulated by the spatial light-modulation element;

wherein each of said first and second image-forming

optical systems is a magnified-image-forming optical system which forms an image with a magnification power greater than one.

2. An image forming apparatus according to claim 1,  
5 wherein said light source comprises a plurality of laser units in each of which a plurality of laser beams enters an optical fiber, and the optical fibers in the plurality of laser units are arranged to constitute a bundle.

3. An image forming apparatus according to claim 2,  
10 wherein each of said plurality of laser units comprises one or more multicavity semiconductor lasers for generating said plurality of laser beams.

4. An image forming apparatus according to claim 2,  
15 wherein each of said plurality of laser units comprises a plurality of single-cavity semiconductor lasers for generating said plurality of laser beams.

5. An image forming apparatus according to claim 1,  
wherein said spatial light-modulation element is a DMD (digital micromirror device).

20 6. An image forming apparatus comprising:  
a spatial light-modulation element having a plurality of pixel portions which are two-dimensionally arranged, and individually modulate a plurality of portions of light applied to the spatial light-modulation element,  
25 according to control signals;

a light source which applies the light to said

spatial light-modulation element;

a first image-forming optical system arranged so that the plurality of portions of the light modulated by said plurality of pixel portions pass through the first  
5 image-forming optical system;

a microlens array being arranged in an image-forming plane of the first image-forming optical system, and having a plurality of microlenses arranged in correspondence with the plurality of pixel portions,  
10 respectively;

an aperture array having a plurality of apertures respectively located at positions at which the plurality of portions of the light which have passed through said plurality of microlenses converge; and

15 a second image-forming optical system being arranged so that the plurality of portions of the light which have passed through said plurality of apertures pass through the second image-forming optical system, and forming on a predetermined surface an image represented by the light  
20 modulated by the spatial light-modulation element;

wherein one of said microlens array and said aperture array has at least one protrusion toward the other of the microlens array and the aperture array, the at least one protrusion has a predetermined height in a direction of  
25 an optical axis, and a relative position between the microlens array and the aperture array is set by one of said microlens

array and the aperture array abutting the at least one protrusion of the other of said microlens array and the aperture array.

7. An image forming apparatus according to claim 6,  
5 wherein each of said at least one protrusion has a top surface, said other of said microlens array and the aperture array has a surface which is in contact with the top surface of the at least one protrusion, and said surface of the other of said microlens array and the aperture array and the top surface of  
10 the at least one protrusion each have a flatness of 0.2 micrometers or smaller.

8. An image forming apparatus according to claim 6, wherein said light source comprises a plurality of laser units in each of which a plurality of laser beams enters an optical  
15 fiber, and the optical fibers in the plurality of laser units are arranged to constitute a bundle.

9. An image forming apparatus according to claim 8, wherein each of said plurality of laser units comprises one or more multicavity semiconductor lasers for generating said  
20 plurality of laser beams.

10. An image forming apparatus according to claim 8, wherein each of said plurality of laser units comprises a plurality of single-cavity semiconductor lasers for generating said plurality of laser beams.

25 11. An image forming apparatus according to claim 6, wherein said spatial light-modulation element is a DMD (digital

micromirror device).

12. An image forming apparatus comprising:

a spatial light-modulation element having a plurality of pixel portions which are two-dimensionally arranged, and individually modulate a plurality of portions of light applied to the spatial light-modulation element, according to control signals;

a light source which applies the light to said spatial light-modulation element;

a first image-forming optical system arranged so that the plurality of portions of the light modulated by said plurality of pixel portions pass through the first image-forming optical system;

a microlens array being arranged in an image-forming plane of the first image-forming optical system, and having a plurality of microlenses arranged in correspondence with the plurality of pixel portions, respectively;

an aperture array having a plurality of apertures respectively located at positions at which the plurality of portions of the light which have passed through said plurality of microlenses converge; and

a second image-forming optical system being arranged so that the plurality of portions of the light which have passed through said plurality of apertures pass through the second image-forming optical system, and forming on a

predetermined surface an image represented by the light modulated by the spatial light-modulation element;

wherein a relative position between said microlens array and said aperture array in a direction of an optical axis is set by joining the microlens array and the aperture array together through a spacer having a predetermined thickness.

13. An image forming apparatus according to claim 12, wherein said spacer has first and second surfaces which are respectively in contact with said microlens array and said aperture array, said microlens array has a third surface in contact with said first surface of the spacer, said aperture array has a fourth surface in contact with said second surface of the spacer, and the first, second, third, and fourth surfaces each have a flatness of 0.2 micrometers or smaller.

14. An image forming apparatus according to claim 12, wherein said light source comprises a plurality of laser units in each of which a plurality of laser beams enters an optical fiber, where the optical fibers in the plurality of laser units are arranged to constitute a bundle.

15. An image forming apparatus according to claim 14, wherein each of said plurality of laser units comprises one or more multicavity semiconductor lasers for generating said plurality of laser beams.

16. An image forming apparatus according to claim 14, wherein each of said plurality of laser units comprises a plurality of single-cavity semiconductor lasers for generating

said plurality of laser beams.

17. An image forming apparatus according to claim 12, wherein said spatial light-modulation element is a DMD (digital micromirror device).